

### SUPPORT FOR THE AMENDMENT

This Amendment amends Claims 8 and 14; and adds new Claims 20-24. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claims 8 and 14 is found in the specification at least at page 13, lines 14-17; page 14, lines 13-15; and page 20, lines 14-18. Support for new Claim 20 is found in the specification at least at page 13, line 19. Support for new Claim 21 is found in the specification at least at page 22, lines 3-4. Support for new Claim 22 is found in the specification at least at page 4, lines 26-27; page 20, lines 22-24; and page 22, lines 3-4. Support for new Claim 23 is found in the specification at least at page 13, lines 13-14. Support for new Claim 24 is found in the specification at least at page 20, lines 14-17. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 8, 10-12, 14, 16-17 and 20-24 will be pending in this application. Claims 8 and 14 are independent.

### REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the interview on November 18, 2008.

As discussed during the interview, the present invention provides a method of producing a high strength TiAl based alloy having a microstructure comprising **60 area% or more of lamellar grains** in which an  **$\alpha_2$  phase** and a  **$\gamma$  phase** are alternately laminated. The microstructure is produced by holding the TiAl based alloy material in an equilibrium temperature range of an  $\alpha$  phase, or in an equilibrium temperature range of an  $(\alpha+\beta)$  phase,

and then subjecting the TiAl based alloy material to **high-speed plastic working while cooling** at a cooling speed of 50 to 700°C/min.

Claims 8, 10-12, 14 and 16-17 are rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,370,839 ("Masahashi").

Masahashi discloses TiAl-based intermetallic compound alloys consisting essentially of a dual-phase microstructure of  $\gamma$  and  $\beta$  phases, with the  $\beta$  phase precipitating at  $\gamma$  grain boundaries. Masahashi at abstract. Masahashi, at column 8, lines 20-37, discloses that the dual-phase microstructure is produced by first preparing an as-cast specimen, containing lamellar colonies 1 of  $\gamma$  and  $\alpha_2$  phases (Fig. 1(a)), then homogenizing the as-cast specimen (Fig. 1(b)), and then isothermally forging the homogenized specimen to produce a microstructure in which  $\beta$  phase 5 precipitates at the boundaries of  $\gamma$  grains 4 (Fig. 1(c)).

However, Masahashi fails to suggest the limitations of independent Claims 8 and 14 of "subjecting the TiAl based alloy material which had been held at that temperature to **high-speed plastic working, while cooling** the material to a predetermined working terminal temperature at a cooling speed of 50 to 700°C/min, to produce a microstructure comprising **60 area% or more of lamellar grains** in which an  $\alpha_2$  phase and a  $\gamma$  phase are alternately laminated".

The Office Action asserts:

The declaration under 37 CFR 1.132 filed April 11, 2008 is insufficient to overcome the rejection of claims 8, 10-12, 14, 16, 17 based upon Masahashi et al as set forth in the last Office action because: declaration tested "a test piece ... subjected to the homogenization heating as defined in Masahashi et al" of undisclosed composition and undisclosed processing steps to particular high speed processing, and concluded when the method of Masahashi et al is modified to include the step of hot working as taught by the present invention, cracking occurs. Office Action at page 4, section 5, lines 6.

However, the attached Second Declaration Under 37 CFR § 1.132 at section 3 shows that in the Declaration Under 37 CFR § 1.132 filed April 11, 2008, the composition of the test piece was Ti-42Al-8V (at%).

In addition, the Second Declaration Under 37 CFR § 1.132 at section 5 shows that in the Declaration Under 37 CFR § 1.132 filed April 11, 2008, the homogenization heating was at 1250°C for 20 minutes. The heating temperature is within Masahashi's range of 1000°C to the solidus temperature. However, the heating time is outside of Masahashi's the range of 2 to 100 hours.

Although the homogenization heating time of 20 minutes in the comparative experiment in the Declaration Under 37 CFR § 1.132 filed April 11, 2008, is not within Masahashi's range of heating time, the comparative experiment is still valid for demonstrating differences between Masahashi and the present invention, because the heating in the comparative experiment is enough to achieve homogenization. Second Declaration Under 37 CFR § 1.132 at section 6.

Thus, the results set forth in the Declaration Under 37 CFR § 1.132 filed April 11, 2008, and in this Declaration show that even if an alloy with a composition superior for forging is used and basically the same homogenization heating conditions as in Masahashi are used, a difference in high-speed working results in a difference in product characteristics. In particular, when the method of Masahashi is modified with high-speed working as set forth in the Declaration Under 37 CFR § 1.132 filed April 11, 2008, and in this Declaration, cracking occurred; while when high-speed working is performed under the conditions set forth in independent Claims 8 and 14, no cracking will occur.

Because Masahashi fails to suggest all the limitations of independent Claims 8 and 14, the rejection over Masahashi should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

Customer Number

**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)



---

Corwin P. Umbach, Ph.D.  
Registration No. 40,211

Attached: Second Declaration Under 37 CFR § 1.132 (unexecuted; executed copy to follow)